

Remarks

Support for the above-requested amendments to claim 1 is found at least in paragraph [0040]. Claim 3 has been amended to correct an inadvertent typographical error. Claim 28 has been amended to recite that the claimed percentage is percent by weight. At least claims 3 and 28 were not amended for any reasons related to patentability. Claim 22 has been canceled without prejudice. Claims 6 and 8 – 20 were canceled without prejudice in previous Amendments. New claim 29 is supported at least by paragraphs [0024] and [0026] and original claim 6.

Applicants understand that Applicants cannot, as a matter of right, amend any finally rejected claim, add new claims, or reinstate previously canceled claims after a final Office Action. However, according to MPEP §714.13, amendments that cancel claims, adopt Examiner suggestions, remove issues for appeal, or in some other way require only a cursory review by the Examiner may be considered. In this regard, Applicants respectfully submit that claim 1 has been amended to include the limitations of claim 22, which was previously presented and for which a prior art search has already been conducted. Additionally, it is submitted that newly added claim 29 is claim 6 re-instated and that claim 6 (now claim 29) was previously presented and that a prior art search was conducted by the Examiner. Therefore, Applicants respectfully submit that only a cursory review of the cited references by the Examiner is necessary to determine the patentability of newly amended claim 1. Accordingly, Applicants respectfully request that claims 1 – 5, 7, 21, and 23 – 29 should be re-considered and passed to allowance.

No question of new matter arises and entry of the above-requested amendments is respectfully requested. Claims 1 – 5, 7, 21, and 23 – 29 are before the Examiner for consideration.

Rejection under 35 U.S.C. §102(e)

Claims 1 – 5, 21, 23, 24, 26, 27, and 28 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application No. 2004/0254285 to Rodrigues, *et al.* (“Rodrigues”). It is asserted that Rodrigues discloses a fiberglass non-woven binder that includes a carboxylic acid monomer, which the Examiner is equating to Applicants’ polycarboxy polymer. It is also asserted that Rodrigues teaches that it is well-known in the art to use crosslinking agents such as triethanolamine in fiberglass binders. The fiberglass

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binder also includes a compound that is capable of forming hydrogen-bonding complexes with the polycarboxy polymer and may further include a catalyst. Examples of hydrogen-bonding complexes identified in Rodrigues include polysaccharides such as maltodextrins. The Examiner states that the hydrogen-bonding complex to polymer binder weight ratio in Rodrigues is from about 1:99 to about 99:1, which is asserted to meet Applicants' requirement that the co-binder be present in an amount of at least 75%. In addition, the Examiner asserts that this hydrogen-bonding complex to polymer binder weight ratio meets Applicants' recitation of a pre-binder to co-binder ratio from about 90:10 to about 25:75 in claim 1.

In response to this rejection, Applicants respectfully direct the Examiner's attention to independent claim 1 and submit that claim 1, as amended, defines a binder composition for glass fibers that is not taught by Rodrigues. Applicants submit that Rodrigues teaches a binder composition that includes at least one carboxy functional copolymer binder crosslinker and at least one compound that is capable of forming a hydrogen-bonding complex with the carboxy functional copolymer. (See, e.g., paragraphs [0012] and [0018]). The hydrogen-bonding complex-forming compound includes compounds such as polysaccharides. (See, e.g., paragraphs [0013] and [0035]). It is desirable that the polysaccharides have a low molecular weight to avoid possible clumping and sticking of the glass fibers. (See, e.g., paragraph [0013]). Examples of suitable hydrogen-bonding complex-forming compounds include dextrans, maltodextrins, and corn syrup. (See, e.g., paragraph [0014]).

Rodrigues, however, does not teach a binder composition that includes (1) a pre-binder that has a polycarboxy polymer and a crosslinking agent and (2) a co-binder that may be a dextrin, a modified dextrin, and/or a maltodextrin in which the co-binder is present in the binder composition in an amount of at least about 50%, and where the molar ratio of the carboxylic acid groups in the polycarboxy polymer to the hydroxyl groups in the crosslinking agent is from 1:3 to 5:1 as required by claim 1. In order for a reference to be anticipatory, each and every element of the claimed invention must be found within the four corners of the cited reference. Thus, because Rodrigues does not teach a binder composition where the molar ratio of carboxylic acid groups to hydroxyl groups is from 1:3 to 5:1 as required by claim 1, Applicants submit that Rodrigues is not an anticipatory reference.

Moreover, Applicants submit that claim 1 has been amended to incorporate the recitation of dependent claim 22, which was not included in this rejection. Thus, Applicants submit that claim 1 is not anticipated by Rodrigues for this additional reason.

In view of the above, Applicants submit that claim 1, and all claims dependent therefrom, are not anticipated by Rodrigues and respectfully request that the Examiner reconsider and withdraw this rejection.

Rejection under 35 U.S.C. §103(a)

Claims 7 and 22 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2004/0254285 to Rodrigues, *et al.* ("Rodrigues"). The Examiner admits that Rodrigues does not teach or suggest that the dextrin is borax modified or that the molar ratio of the carboxylic acid groups to the hydroxyl groups is 1:3 to 5:1. However, the Examiner concludes that it would have been obvious to one of skill in the art to have modified the dextrin of Rodrigues with borax to increase the fire resistance of the end product. In addition, the Examiner concludes that it would have been obvious for one ordinarily skilled in the art to arrive at the claimed molar ratio of carboxylic acid groups to hydroxyl groups in order to lower the curing temperature.

Initially, Applicants submit that claim 22 has been canceled without prejudice, thereby rendering the rejection of this claim moot.

With respect to claim 7, Applicants respectfully direct the Examiner's attention to independent claim 1 and submit that amended claim 1 defines a binder composition that is not taught or suggested within Rodrigues. Because the binder composition of Rodrigues is discussed in detail above, for purposes of brevity, the details of the binder composition of Rodrigues will not be reiterated with respect to this rejection.

Applicants respectfully submit that Rodrigues does not teach or suggest a binder composition that includes (1) a pre-binder that has a polycarboxy polymer and a crosslinking agent and (2) a co-binder that may be a dextrin, a modified dextrin, and/or a maltodextrin in which the co-binder is present in the binder composition in an amount of at least about 50%, where the molar ratio of the carboxylic acid groups in the polycarboxy polymer to the hydroxyl groups in the crosslinking agent is from 1:3 to 5:1 as claimed in claim 1. Although Rodrigues teaches a carboxy-functional copolymer binder and a polysaccharide, Rodrigues does not teach or suggest a binder composition where the molar ratio of the carboxylic acid

groups in the polymer to the hydroxyl groups in the crosslinker is from 1:3 to 5:1 as required by claim 1. In fact, Rodrigues is silent as to any teaching of a molar ratio of carboxylic acid groups to hydroxyl groups.

It is asserted in the Office Action that it would have been obvious to one of skill in the art to make the molar ratio of the carboxylic acid groups to the hydroxyl groups in the binder composition be 1:3 to 5:1, as it would be routine for one of skill in the art to optimize the molar range. Applicants respectfully disagree. Rodrigues teaches that the binder composition contains at least one carboxy-functional polymer binder. (See, e.g., paragraphs [0011] and [0018]). Non-limiting examples of carboxylic acid monomers useful in forming the carboxy-functional polymer include acrylic acid, methacrylic acid, crotonic acid, isocrotonic acid, fumaric acid, maleic acid, cinnamic acid, 2-methyl maleic acid, itaconic acid, 2-methyl itaconic acid, sorbic acid, α,β -methylene glutaric acid, maleic anhydride, itaconic anhydride, acrylic anhydride, methacrylic anhydride, and mixtures thereof. (See, e.g., paragraph [0019]). Crosslinking agents that may be used in the binder composition of Rodrigues include, but are not limited to, trihydric alcohol, β -hydroxy alkyl amines, polyols, ethanol amines, hydroxyl alkyl urea, and oxazolidone. (See, e.g., paragraph [0028]). In view of the vast array of possible polymers and crosslinking agents disclosed by Rodrigues, it is respectfully submitted that one of skill in the art would not arrive at the claimed range for the molar ratio of carboxylic acid groups to hydroxyl groups without undue experimentation due to the myriad of combinations of molar ratios that may be derived from the virtually limitless combinations of polycarboxy polymers and hydroxyl groups taught by Rodrigues.

In addition, Applicants submit that there is no motivation for one of skill in the art to arrive at the presently claimed invention based on the disclosure of Rodrigues. To establish a *prima facie* case of obviousness, there must be some motivation, either within the reference or in the knowledge of those of skill in the art, to modify the reference or combine the references' teachings, there must be a reasonable expectation of success, and the prior art references must meet all of the claim limitations. (See, e.g., *Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 3, August 2005, §2142). It is respectfully submitted that one of ordinary skill in the art would not be motivated to arrive at the presently claimed binder composition that includes (1) a pre-binder that has a polycarboxy polymer and a crosslinking agent and (2) a co-binder that may be a dextrin, a modified dextrin, and/or a maltodextrin in which the co-binder is present in the binder

composition in an amount of at least about 50%, and where the molar ratio of the carboxylic acid groups in the polycarboxy polymer to the hydroxyl groups in the crosslinking agent is from 1:3 to 5:1 based on the teachings of Rodrigues when Rodrigues is silent with respect to any teaching of a molar ratio of carboxylic acid groups to hydroxyl groups. Without some teaching or suggestion, there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness. Further, it is respectfully submitted that one of ordinary skill in the art would not have arrived at the claimed range for the molar ratio of carboxylic acid groups to hydroxyl groups based on the teachings of Rodrigues without undue experimentation due to the myriad of combinations of molar ratios that may be derived from the extensive and non-limiting lists of possible polycarboxy polymers and hydroxyl groups disclosed by Rodrigues. Therefore, Applicants submit that claim 1 is non-obvious and patentable over Rodrigues.

Further, the present inventors have unexpectedly and surprisingly discovered that dextrin and polycarboxylic acid, when used in conjunction with each other, act in a synergistic manner to provide improved hot tensile strengths to glass veils. (See, e.g., Example 2, paragraph [0063], and Figure 2). In addition, it was surprisingly discovered that glass veils impregnated with the inventive dextrin binder composition possessed hot tensile strengths that were greater than the hot tensile strengths of glass veils impregnated with polycarboxylic acid based binder compositions that did not contain dextrin. (See, e.g., paragraphs [0028], [0052], and [0060], Example 1, and Figure 1). Also, it was discovered that fibrous products formed with the inventive sizing composition utilize a reduced amount of polyacrylic acid based binders, which, in turn, reduces manufacturing costs. (See, e.g., paragraphs [0030] and [0053]). Further, it is believed that the increased hot tensile strengths would enable a glass veil formed with the inventive binder composition to withstand a higher speed on the production line, have a lower sensitivity to deformation, and possess less surface defects. (See, e.g., paragraph [0065]). Applicants respectfully submit that the presently claimed invention is not obvious for these additional reasons.

Applicants submit that because independent claim 1 is not taught or suggested within Rodrigues (as discussed *supra*) and because claim 7 is dependent upon independent claim 1 and contains the same elements as claim 1, claim 7 is also not taught or suggested by Rodrigues. In light of the above, Applicants submit that claim 7 is not obvious over Rodrigues and respectfully request reconsideration and withdrawal of this rejection.

Rejection under 35 U.S.C. §103(a)

Claim 26 has been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2004/0254285 to Rodrigues, *et al.* ("Rodrigues") in view of U.S. Patent No. 5,026,746 to Floyd, *et al.* ("Floyd"). The Examiner asserts that Floyd discloses a binder composition that includes a starch and acrylic acid monomers. A cross-linking agent and a catalyst may also be present in the composition. In addition, it is asserted that the ratio of monomer to starch may be varied from about 1:50 to 15:1, preferably from 1:1 to about 7:1. Preferred dextrins include white dextrins, canary dextrins, and British gums. The Examiner concludes that it would have been obvious to one of skill in the art to use the dextrins of Floyd as the dextrins of Rodrigues in order to obtain a binder composition with improved recovery.

In response to this rejection, Applicants respectfully direct the Examiner's attention to independent claim 1 and submit that claim 1, as amended, defines a binder composition that is not taught or suggested within Rodrigues or Floyd. With respect to Rodrigues, Applicants submit that the binder composition of Rodrigues is discussed in detail above, and for purposes of brevity, the binder composition of Rodrigues will not be discussed in detail with respect to this rejection.

With respect to Floyd, Floyd discloses a binder for non-woven fibers that is prepared with a starch-polymer graft, starch, and a starch crosslinking agent. (See, e.g., Abstract and column 2, lines 35 – 39). The binder also provides a starch system that is compatable with an acrylic latex and preferably provides a non-formaldehyde self-crosslinking resin with tensile strengths equivalent to an all acrylic binder, but which exhibits less elongation and good water resistance. (See, e.g., column 2, lines 48 – 53). The low molecular weight starch hydrolyzate suitable for use in the binder composition can be obtained from a variety of starches and starch derivatives. (See, e.g., column 3, lines 29 – 30). Floyd teaches that certain dextrins such as white dextrins, canary dextrins, and British gums may be used in the binder composition. (See, e.g., column 3, lines 47 – 51). However, maltodextrins are particularly preferred. (See, e.g., column 3, line 58).

Applicants respectfully submit that Rodrigues and Floyd do not teach or suggest a binder composition that includes (1) a pre-binder that has a polycarboxy polymer and a crosslinking agent and (2) a co-binder that may be a dextrin, a modified dextrin, and/or a

maltodextrin in which the co-binder is present in the binder composition in an amount of at least about 50%, and where the molar ratio of the carboxylic acid groups in the polycarboxy polymer to the hydroxyl groups in the crosslinking agent is from 1:3 to 5:1 as required by claim 1. Neither Rodrigues nor Floyd teach or suggest a binder composition where the molar ratio of carboxylic acid groups to hydroxyl groups is from 1:3 to 5:1 as claimed in claim 1. In fact, Rodrigues and Floyd are silent with respect to any teaching of a molar ratio of carboxylic acid groups to hydroxyl groups. Thus, it is respectfully submitted that Rodrigues and Floyd do not teach or suggest the claimed molar ratio. In addition, Applicants submit that Floyd fails to make up for the deficiencies of Rodrigues, namely, the teaching of a molar ratio of carboxylic acid groups in the polycarboxy polymer to hydroxyl groups in the crosslinking agent from 1:3 to 5:1. As a result, Applicants respectfully submit that the combination of Rodrigues and Floyd would not result in the presently claimed invention. In view of the above, Applicants submit that claim 1 is non-obvious and patentable.

Additionally, Applicants submit that there is no motivation for one of skill in the art to arrive at the invention claimed in claim 1 based on the disclosures of Rodrigues and Floyd. To establish a *prima facie* case of obviousness, there must be some motivation, either within the reference or in the knowledge of those of skill in the art, to modify the reference or combine the references' teachings, there must be a reasonable expectation of success, and the prior art references must meet all of the claim limitations. (See, e.g., *Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 3, August 2005, §2142). It is submitted that one of ordinary skill in the art would not be motivated to arrive at the presently claimed binder composition that includes (1) a pre-binder that has a polycarboxy polymer and a crosslinking agent and (2) a co-binder that may be a dextrin, a modified dextrin, and/or a maltodextrin in which the co-binder is present in the binder composition in an amount of at least about 50%, and where the molar ratio of the carboxylic acid groups in the polycarboxy polymer to the hydroxyl groups in the crosslinking agent is from 1:3 to 5:1 based on the teachings of Rodrigues and Floyd when both Rodrigues and Floyd fail to teach or suggest the claimed molar ratio. Without some teaching or suggestion, there can be no motivation, and without motivation, there is no *prima facie* case of obviousness.

In view of the above, it is respectfully submitted that independent claim 1 is not taught or suggested by the combination of Rodrigues and Floyd and that claim 1 is therefore non-obvious and patentable. Because claim 26 is dependent upon claim 1, which is not

taught or suggested by Rodrigues and Floyd, either alone or in combination as discussed above and because claim 26 is dependent upon independent claim 1 and contains the same elements as claim 1, it is submitted that dependent claim 26 is also not taught or suggested by Rodrigues and/or Floyd.

In light of the above, Applicants submit that claim 26 is not obvious over Rodrigues in view of Floyd and respectfully request that the Examiner reconsider and withdraw this rejection.

Conclusion

In light of the above, Applicants believe that this application is now in condition for allowance and therefore request favorable consideration.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

If necessary, the Commissioner is hereby authorized to charge payment or credit any overpayment to Deposit Account No. 50-0568 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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